

Reducing Forage Producers' Drought Vulnerability in the Southeastern USA

National Oceanic and Atmospheric Administration
Sector Applications Research Program – SARP
Reporting Period 04/01/2010 – 06/30/2010

Goal and Objectives

The main goal of this project is to develop a decision support system specifically designed to help forage producers cope and adapt to drought conditions in the southeastern USA. A simple, yet reliable water deficit index will be monitored and forecast based on weather data collected by weather networks in Florida and Georgia, short term weather forecast provided by the NWS, and ENSO phases. The system will also include suggested management options for current and anticipated drought conditions. Specific objectives include:

1. Assessment of forage producer needs;
2. Develop a water deficit index and validate in producers' fields;
3. Develop a drought information and decision aid tool for forage producers on AgroClimate.org;
4. Deliver training workshops and outreach events in Florida and Georgia

Summary of accomplishments

Activities conducted during the reporting period include tasks under objectives 1 and 3. Under Objective 1 a survey instrument consisting of 20 questions was designed used to elicit forage specialists' and producers' knowledge and attitudes regarding climate-forage interactions. Questions addressed perceptions of good and bad years, triggers for management action, and general information on types of grass and bales most frequently used. The written surveys were administered at forage workshops and field days in Florida and Georgia. Participation was voluntary and anonymous. The sample population of respondents was 115 people from 61 Counties. Preliminary results show great interest in the development of a drought monitor and identify thresholds for "good" and "bad" hay years, and triggers for adaptive management. Survey results will be used to identify research gaps and these will be further explored through interviews, focus groups, and two workshops. Preliminary results show great interest in the development of a drought monitor and identify thresholds for "good" and "bad" hay years, and

triggers for adaptive management. Survey results will be used to identify research gaps and these will be further explored through interviews, focus groups, and two workshops. Under Objective 3, the web-based drought monitoring system was implemented on AgroClimate.org and is currently monitoring stations in Florida and Georgia: <http://www.agroclimate.org/tools/drought>. Soil moisture monitoring activities continued throughout the entire reporting period biomass sampling in two Florida fields has been reinitiated after the end of the winter season. Results of this effort will enable the quantification of production losses during periods of drought; enabling forage producers to make better decisions based on current and expected weather patterns.

Objective 1: Assessment of forage producer needs

A survey instrument consisting of 20 questions was designed used to elicit forage specialists' and producers' knowledge and attitudes regarding climate-forage interactions. Questions addressed perceptions of good and bad years, triggers for management action, and general information on types of grass and bales most frequently used. The written surveys were administered at forage workshops and field days in Florida and Georgia Participation was voluntary and anonymous. The sample population of respondents was 115 people from 61 Counties. Purposive sampling, a well-established method in qualitative research (Patton 1990, Bernard 1995) was used. In a purposive sampling, criterion-based sample respondents are selected based on specific criteria rather than by random sampling. Our criteria were to identify producers and forage specialists in Florida and Georgia.

Initial Results

Among the sample population, 72 respondents baled hay on their farms whereas 31 did not. Survey respondents presented a wide array of acreage under hay. The distribution can be seen in Figure 1. However, 70 out of 106 respondents managed under 250 acres. Similarly, cattle ownership was greatest among those with less than 250 head. Producers use a wide variety of grasses to make hay. In all twenty-three species and cultivars were mentioned. Principal cultivars mentioned were coastal, Tifton 44 and 85, Bermuda, Rye, Fescue, and Alicia, In addition, other grasses were mentioned at least once by respondents. These included wheat,

clover, Russell, Tifton 78, Tifton 9, mixes, Floralta, Limpograss, Jiggs bmg, Malthea, and Dangola, crab grass, St. Augustine, millet, and others.

Definitions of Good and Bad Years

To elicit quantitative data for typical, great, and very bad hay years, we asked respondents how many bales of hay per acre they were able to make under each category. Answers are available in Table 1 and can be visualized in Figure 1.

Table 1. Responses on hay made during typical, great, and very bad hay years.

	< 1	1 to 3	4 to 6	7 to 10	> 10
Typical Year	0	5	14	11	9
Great Year	0	3	8	12	10
Very Bad Year	2	15	2	4	2

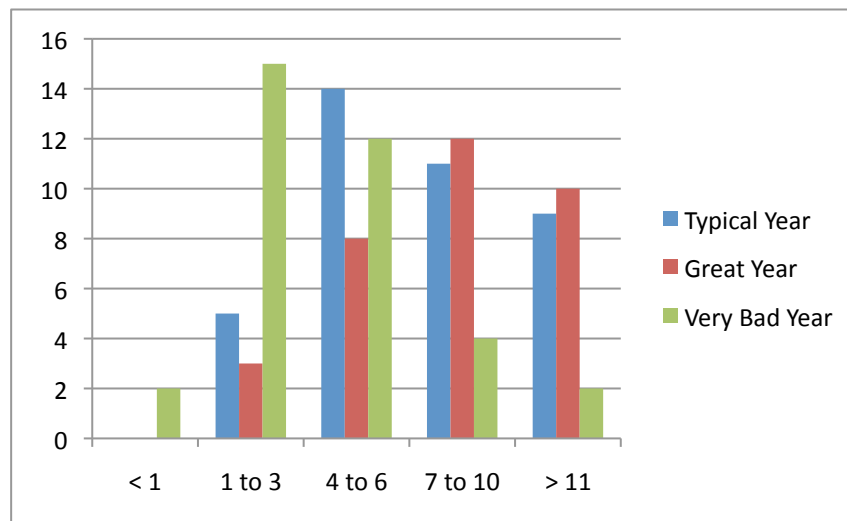


Figure 1. Distribution of amount of hay made in typical, great, and very bad hay years.

To further learn from experiential knowledge of the sample population we included questions regarding the identification of good and bad years for hay-makers. Separate questions were asked for identification of these categories and, perhaps more interestingly for the development of a drought monitor, how these years are defined. Figure 2 shows the distribution of responses to these questions.

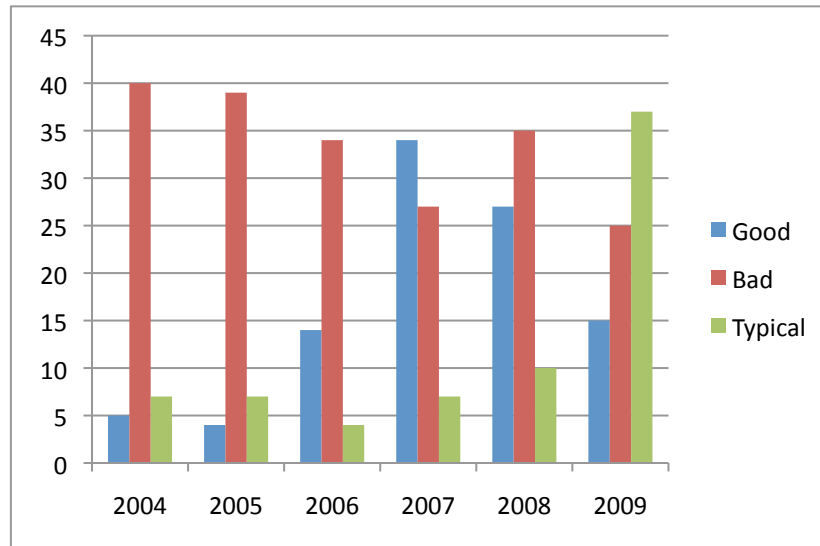


Figure 2. Good, Bad, and Typical Hay Years

Good Hay Years

The principal indicators for a good hay year were by good hay production and adequate rainfall. "good hay production " was variously defined as hay in early spring and late winter, grazing through June, 20% above average production, 3-4 cuttings, 4 rolls acre, 4 tons/acre, 6 tons or more, and 13 bales per acre. "Adequate rainfall" was defined by one respondent as 3 to 8 inches per month. Prices, several weather conditions, and timely distributed rain were also mentioned. Weather conditions mentioned included good/warm temperatures, no late freezes, no early freezes, and low number of frosts.

In addition, a diverse category labeled "other" included steady forage growth, good hay quality, less or no feed/hay required, good calving, good grazing, good winter grazing, grazing through June, hay making in fall, and no disease or insects. Answers may be visualized in Figure 3.

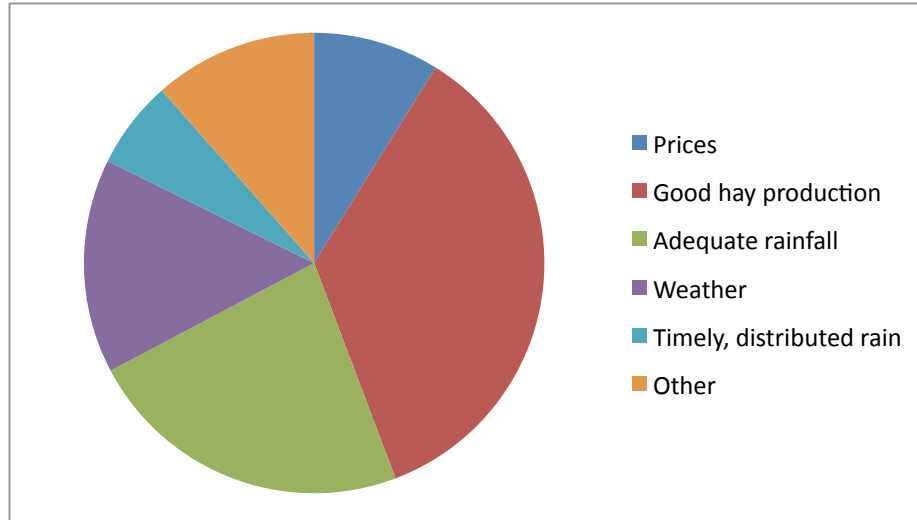


Figure 3. Indicators of Good Hay Years

Bad Hay Years

The principal indicators for a bad hay year mentioned by the sample population were below average production and little rainfall/drought. "Below average hay production was defined as loss of one cutting, 8 bales/acre, one cutting, 2 tons per acre, have to feed hay June, below 4 tons, 2 rolls or less per acre, 2 to 3 cuttings, less than less than 3 cuttings, and less than one ton per acre; 20% below average. "Little rainfall/drought was defined by one respondents as over 30 days without rain. In addition, other indicators of bad hay years fell into the categories of prices, weather, timely, distributed rain and others. "Weather" conditions mentioned to typically occur in bad hay years were excess cloudy/rainy days during harvest, tropical storms/hurricanes, long dry down to mature, too hot; too cold, early freezes, and frost. Other indicators mentioned by few respondents were poor hay quality, army worms, and pests. Responses are available in Figure 4.

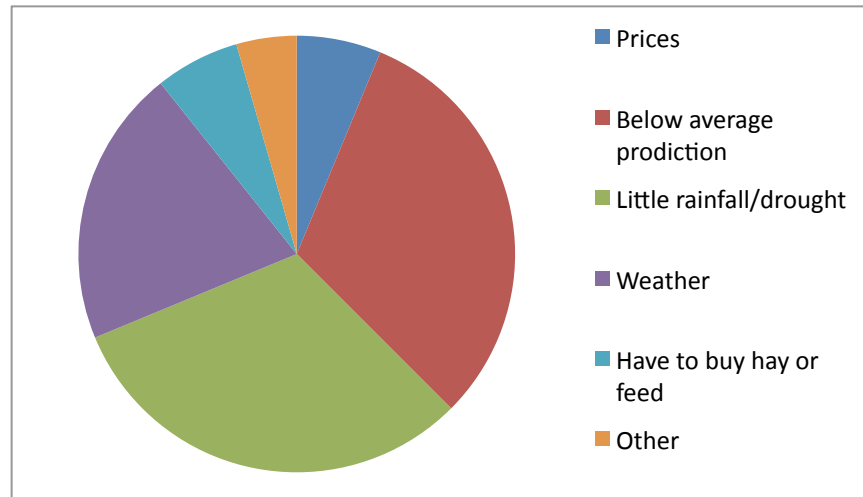


Figure 4. Indicators of Bad Hay Years

Thresholds for management action

To complement existing information on triggers for management decisions, we asked what field observations of cattle or grass triggered the movement of cattle to another pasture. Respondents mentioned short grass in first place followed by over grazing, low volume, drought and "other". A specific threshold for short grass given by three respondents indicated two to three inches. Referring to over grazing, one respondent considered that 50% of forage removed was a tell tale threshold for this indicator. "Other" indicators mentioned included a need to spray, time line, new grass, condition of other fields, and loss of body condition.

We asked what field observations of cattle or grass triggered respondents to sell cattle to reduce the stocking rate. The most common response was low grass/hay/feed, followed by drought, low production and "other". No specific thresholds were mentioned but the category "other" included month of year, winter, sell only cull or calves, and excess litter. Another management option is to graze a field that had previously been reserved for hay. To this, the surveyed responded that low grass or hay is the principal trigger. Enough hay produced, drought, winter, late spring, no fencing, bad weather for baling, and early frosts were other trigger that could lead to this decision.

A management decision that represents the opposite of a hay maker's goal is the need to buy hay. When asked what would lead them to make this decision, respondents mentioned low hay and grass in the first place, followed by bad weather (frost, early frost, dry spell, cold). Price and cattle condition were cited by two respondents and one stated he did not buy hay. An issue explored were other management practices having to do with hay that we may not be aware of and what triggers led to their implementation. A need to reseed or rest a pasture as well as drought and winter were mentioned by most respondents. Others mentioned excess grass, calving time, body condition, being low on grass, too much rain, and weed pressure. However, these triggers were not tied to specific management practices but referred in general to all hay management decisions.

Results from this survey will enable a more objective interaction with forage producers during the workshops planned for August/September of 2010 in Florida and Georgia. During these workshops the drought monitoring tool will be presented and demonstrated for feedback and suggestions.

Objective 3. Develop a drought information and decision aid tool for forage producers on AgroClimate.org

Activities under this objective included the implementation of the monitoring tool on AgroClimate.org (Figure 5). The current version calculates daily values of the ARID drought index for three different soil types: sand, sandy-loam, and loam and indicates 3 levels of stress: Little or no stress (green); Stress watch (yellow); and Stress warning (red). ARID is calculated for 36 weather stations belonging to the Florida Automated Weather Network (FAWN) and 79 stations belonging to the Georgia Automated Environmental Monitoring Network (GAEMN). We plan to include a forecasting ability to this tool and also a tab indicating anomalies based on historical levels of ARID. For that we are currently developing a methodology to estimate historical levels of reference evapotranspiration based on limited datasets available for National Weather Service's Cooperative Observer network (NCDC TD 3200).

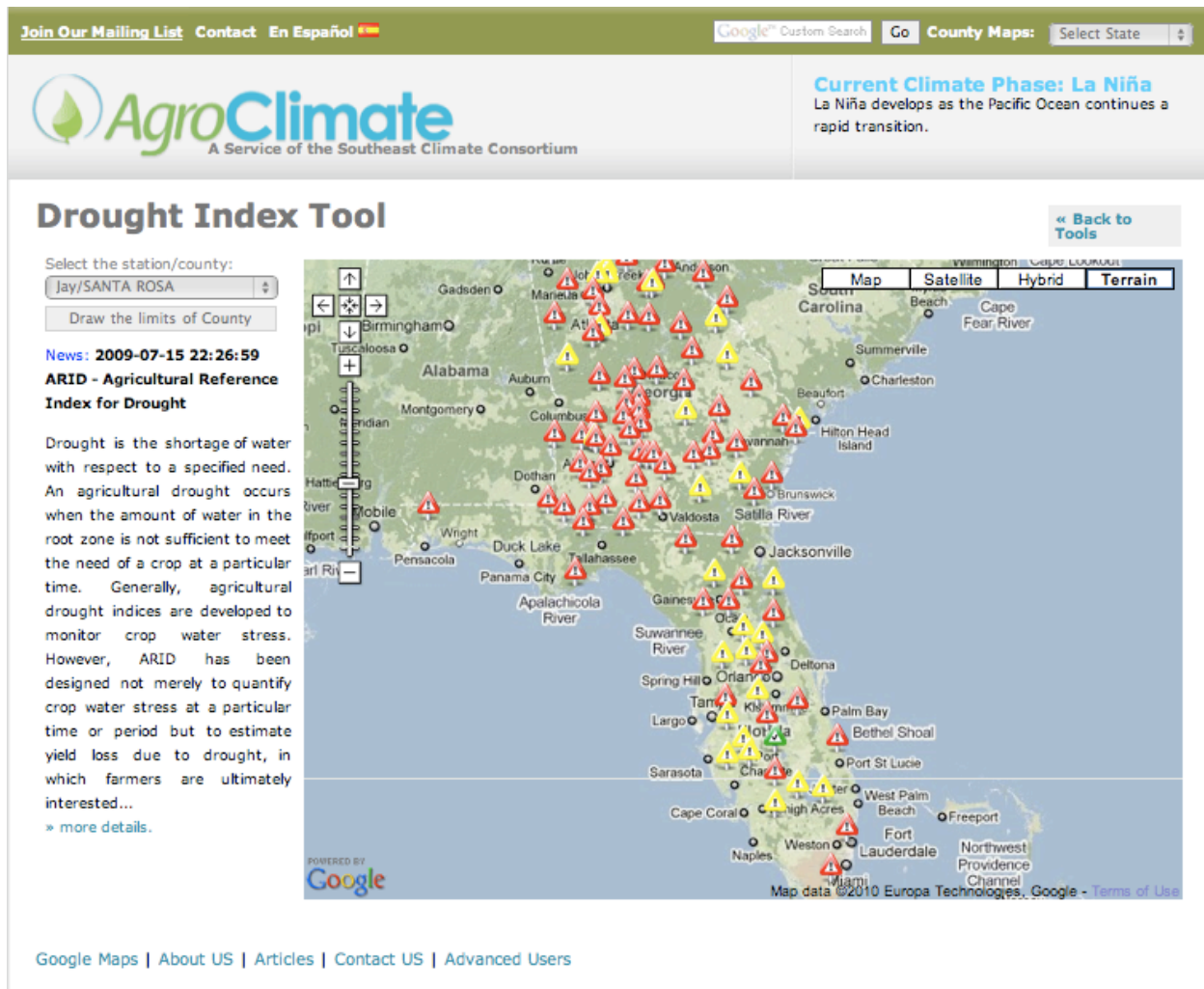


Figure 5. Drought Index monitoring tool on AgroClimate.org (<http://www.agroclimate.org/tools/drought>)

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